

Application No.: 10/055,157

Docket No.: JCLA4827-CIP

REMARKS**Present Status of the Application**

The Office Action objected the drawings and the amendments filed on January 10, 2003 for adding new matters. The Office Action rejected claims 1-20 under 35 U.S.C.112, 1st paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor has possession of the claimed invention. Claims 1-3, 5 and 6 were rejected under 35 U.S.C. 103(a), as being unpatentable over Walsh et al. (US Patent No. 6,228,741). Claims 8-10, 12-16 and 18-20 were rejected under 35 U.S.C. 103(a), as being unpatentable over Walsh in view of Kuehne et al. (US Patent No. 6,146,975). Claims 4 and 7 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh and in view of Breiten et al. (US Patent No. 4,836,885). Claims 11 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh in view of Kuehne and further in view of Breiten.

Claims 1, 8, 14 and 20 have been amended, while the specification and drawings have been amended, for canceling the new matters as suggested by the Office Action and for clarification purposes. This Amendment is promptly filed to place the above-captioned case in condition for allowance. No new matter has been added to the application by the amendments made to the claims, specification or otherwise in the application. After entering the amendments and considering the following remarks, a notice of allowance is respectfully solicited.

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For The Drawings

The Office Action objected the drawings filed on January 10, 2003 for adding new matters. The Office Action pointed out that the thin film 150 should be discontinuous and almost no thin film 150 was formed on the sidewalls 145.

Figures 1B to 1D are amended and enclosed. Submitted for the Examiner's approval are proposed drawing changes, with the corrections indicated in red ink and revised formal drawings will be submitted in compliance with U.S. Patent and Trademark Office Guidelines, upon allowance of the present application. Applicant believes this amendment of the drawings has cancelled the new matters. Reconsideration and withdrawal of this objection is respectfully requested.

Discussion of 112 rejections

Claims 1-20 were rejected under 35 U.S.C. 112, 1st paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor has possession of the claimed invention.

Applicant has amended the specification and claims 1, 8, 14 and 20, as suggested by the Office Action. Applicant believes this amendment of the drawings has cancelled the new matters. Accordingly, the claims have been amended to recite "while the thin film above the trench protects the insulation layer in the trench", while the specification has been amended to delete the term "substantially".

Reconsideration and withdrawal of this objection is respectfully requested.

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Discussion of 103 Rejections

Claims 1-3, 5 and 6 were rejected under 35 U.S.C. 103(a), as being unpatentable over Walsh et al. (US Patent No. 6,228,741). Claims 8-10, 12-16 and 18-20 were rejected under 35 U.S.C. 103(a), as being unpatentable over Walsh in view of Kuehne et al. (US Patent No. 6,146,975). Claims 4 and 7 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh and in view of Breiten et al. (US Patent No. 4,836,885). Claims 11 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh in view of Kuehne and further in view of Breiten.

Applicants respectfully traverse the rejections for at least the reasons set forth below.

The independent claims 1, 8 and 14 have been amended to more clearly define the method according to the present invention. No new matter has been added to the amendment of the claims. Supporting grounds can be found in page 6, lines 19-20 and page 6, lines 23-24 of the specification. From Fig. 1D, it clearly shows that the thin film 150 above the trenches are not removed because of the protection of the screen layer 160b above the trenches, while the thin film 150 on the insulation layer 140 above the active areas is removed along with the screen layer 160a. That is, the screen layer 160a and the thin film 150 above the active areas are removed at the same time, in the present invention.

Applicant respectfully asserts that the method claimed in the present invention patentably distinguishes over Walsh's or Kuehne's method, because the references at least lack these features discussed in the followings.

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Walsh discloses depositing HDP oxide 40 to fill the trench 25 and on the nitride 30 and followed by in-situ sputtering etch (Step 150) to make sure the edges of the nitride 30 being exposed. Next, a conformal nitride cap layer 50 is formed along the profile of the HDP oxide 40 (covering the trench and the active areas). A patterned photoresist 60 is formed above the trench as a mask for patterning and etching the conformal nitride cap layer 50, to remove the nitride cap layer 50 over the active areas. After the nitride cap layer 50 over the active areas is removed, the patterned photoresist 60 is then removed, as shown in Fig. 7. The HDP oxide 40 is removed with the patterned cap nitride layer 50 as a mask.

In fact, Walsh merely discloses patterning and etching the cap nitride layer 50 using various methods. However, the Office Action alleged that the patterned photoresist 60 used in the lithography step for patterning and etching the cap nitride layer 50 is comparable to the screen layer of the present invention. Even taking the above allegation into consideration, Walsh obviously teaches removing a portion of photoresist over the active areas (for forming patterned photoresist 60 over the trench) **before** removing the cap nitride layer 50 over the active areas.

Clearly, Walsh fails to teach or suggest “removing the screen layer and the thin film over the active region **at the same time**, while the screen layer and the thin film above the trenches are not removed” as claimed in the present invention. Hence, Walsh fails to disclose all the features, as recited in independent claims 1, 8 and 14.

Although Kuehne discloses forming a pad oxide layer 22 and a silicon nitride polishing stop layer 23 covering the substrate 21, Kuehne fails to teach or suggest removing the screen layer and the thin film over the active region at the same time, while the screen layer and the thin

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film above the trenches are not removed. Therefore, Kuehne did not remedy deficiencies of Walsh. In fact, Kuehne discloses a CMP process for STI technology involving dual polishing stop layers, which is contradictory to the objectives of the present invention.

As discussed above, both Walsh and Kuehne lack these features emphasized above. Moreover, Kuehne teaches away by disclosing the CMP process for STI.

As noted in the Office Action, Breiten discloses forming a pad oxide layer 13 and a variety materials being used for the second layer 25. Breiten fails to teach or suggest the features emphasized above and does not remedy deficiencies of Walsh or Kuehne.

In contrary, in the present invention, the thin film and the screen layer have uneven thickness above the trenches or the active areas. The screen layer above the active areas and the thin film above the active areas are removed at the same time. The remaining screen layer protects the underlying thin film above the trenches. In the present invention, **no CMP is required** to form shallow trench isolations, thus preventing scratches or defects formed on the surface of the active areas and the STI.

Thus, even if combined, the combination of the cited references fails to arrive at the present invention as recited in independent claims 1, 8 and 14. For at least the same reasons, dependent claims are submitted to patently define over the cited references. Reconsideration and withdrawal of the rejection are respectfully requested.

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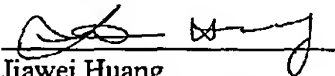
CONCLUSION

For at least the foregoing reasons, it is believed that all pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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